Anticyclonic - Rotating in a clockwise direction when viewed from above, similar to a high pressure area. These features rotate from right to left when viewing from the ground.

Anvil - The flat, spreading top of a cumulonimbus, often shaped like a blacksmith's anvil.

Beaver('s) Tail - A low cloud band with a relatively broad, flat appearance suggestive of a beaver's tail. It is attached to a supercell's updraft base and extends to the east or northeast.

Clear Slot - A local region of clearing skies or reduced cloud cover, indicating an intrusion of drier air; often seen on the west or southwest side of a wall cloud. A clear slot is visual evidence of a rear flank downdraft.

Cyclonic - Rotating in a counterclockwise direction when viewed from above, similar to a low pressure area. These features rotate from left to right when viewing from the ground

Downburst - A strong downdraft resulting in an outward burst of damaging winds on or near the ground. Sometimes called "straight-line winds", downbursts may be large (macroburst) or small (microburst) in scale.

Downdraft - A column of air that rapidly sinks toward the ground, usually accompanied by precipitation as in a shower or thunderstorm.

Flanking Line - A line of cumulus or towering cumulus clouds connected to and extending outward from the most active part of a supercell, normally on the southwest side.

Funnel Cloud - A condensation funnel extending from the base of a thunderstorm, associated with a rotating column of air that is *not* in contact with the ground.

Glaciated - Having the appearance of a cirrus cloud, i.e., thin and fibrous in appearance. Glaciated clouds are associated with the tops of thunderstorms, especially those with weaker updrafts.

Gust Front - The leading edge of gusty surface winds from thunderstorm downdrafts; sometimes associated with a shelf cloud or roll cloud.

Gustnado - A surface-based circulation associated with thunderstorm outflow. Gustnadoes are not associated with updrafts and are not attached to cloud bases, so they are not considered true tornadoes.

High Precipitation (HP) Supercell - A supercell with a large amount of visible precipitation encircling the mesocyclone. HP supercells can be difficult to observe visually, as the precipitation often obscures the updraft-related cloud features.

Inflow Bands - Bands of low clouds, arranged parallel to the low-level winds and moving into or toward a thunderstorm. They may indicate the strength of the inflow of moist air into the storm and its potential severity.

Landspout - A tornado that does not arise from organized storm-scale rotation and therefore is not associated with a wall cloud or a mesocyclone. Nearly always located in the updraft area of a thunderstorm.

Low Precipitation (LP) Supercell - A supercell with little visible precipitation falling from it. LP supercells often have flared-out updraft towers with striations, thus they are easy to recognize visually. However, they can be difficult to detect on radar.

Mammatus Clouds - Rounded, smooth, sack-like protrusions hanging from the underside of a thunderstorm anvil. Mammatus clouds often accompany severe thunderstorms, but do not produce severe weather.

Mesocyclone - A storm-scale region of rotation, typically around 2-6 miles in diameter and often found in the right rear flank of a supercell (or on the front flank of an HP storm).

Multiple-vortex Tornado - a tornado in which two or more condensation funnels or debris clouds are present, often rotating about a common center or about each other.

Overshooting Top - A dome-like protrusion above a thunderstorm anvil, representing a strong updraft.

Power Flash - A blue-green flash that is often a visual indication of damaging winds.

Rain Foot - A horizontal bulging of a precipitation shaft near the ground, forming a foot-shaped prominence. It is a visual indication of strong outflow winds.

Rain-free Base - A dark, horizontal cloud base with no visible precipitation beneath it. It typically marks the location of the thunderstorm updraft.

Rear Flank Downdraft - A region of sinking dry air on the back side of, and wrapping around, a mesocyclone. It often is visible as a clear slot wrapping around the wall cloud.

Scud - Small, ragged, low cloud fragments that are unattached to the main thunderstorm cloud base, but can become part of it.

Severe Thunderstorm - A thunderstorm which produces tornadoes, hail 1.00 inch or more in diameter, or winds of 50 knots (58 mph) or more. Structural wind damage may imply the occurrence of a severe thunderstorm.

Shelf Cloud - A low, horizontal wedge-shaped cloud, associated with a thunderstorm gust front. The shelf cloud is usually attached to the base of the parent cloud above it.

Squall Line - A solid or nearly solid line or band of active thunderstorms. Squall lines typically have updraft areas on the leading edge, above or just ahead of a large gust front.

Striations - Grooves or channels in cloud formations, arranged parallel to the flow of air and therefore depicting the airflow relative to the parent cloud. Striations often reveal the presence of rotation, as in the barber pole or "corkscrew" effect often observed with a rotating updraft.

Supercell - A thunderstorm with persistent storm scale rotation. Supercells are responsible for a high percentage of severe weather events - tornadoes, extremely large hail and damaging straight-line winds.

Tail Cloud - A horizontal, tail-shaped cloud (not a funnel cloud) at low levels extending from the wall cloud toward the thunderstorm's precipitation region.

Tornado - A violently rotating column of air in contact with the ground and extending from the base of a thunderstorm.

Towering Cumulus - A large cumulus cloud with great vertical development, usually with a cumuliform or cauliflower-like appearance, but lacking the characteristic anvil of a cumulonimbus.

Updraft - A column of rising air, often associated with the active portion of a thunderstorm.

Virga - Precipitation which falls from a cloud base but evaporates before reaching the ground. Virga often has a streaky or stringy appearance as it hangs down from the cloud base.

Wall Cloud - A localized, persistent, often blocky or abrupt lowering from a rain-free base. Wall clouds suggest a strong updraft, and normally are found on the south side of the thunderstorm.

Watch - A severe weather forecast product indicating conditions are favorable for severe weather. Watches typically cover numerous counties and are valid for approximately six hours.

Warning - An urgent severe weather product indicating severe weather is imminent or occurring. Warnings are typically issued on a storm by storm basis and are usually valid for one hour or less.

THE STORM SPOTTER'S CHECKLIST

National Weather Service
Fort Worth/Dallas, TX
www.weather.gov/fortworth 1.800.792.2257

REPORTING TIPS

- Be clear in position reporting (yours and event's).
- Report rainfall impacts and not rainfall rates. Report significant features/events immediately.
- If you are unsure of what you're seeing, make your report but express the uncertainty also.
- Reports of environmental conditions (outflow, strong warm moist inflow, etc.) are helpful.

SAFETY TIPS

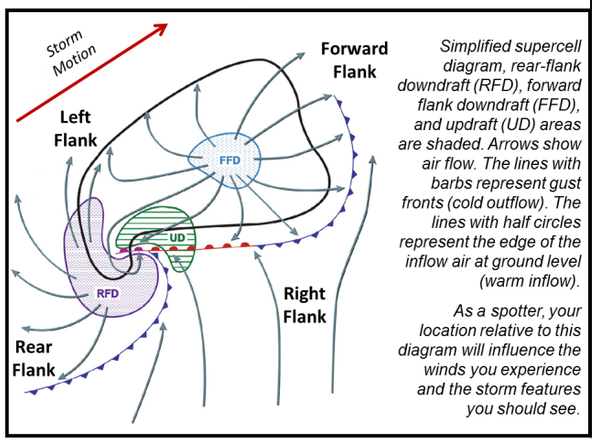
- Beware of flooding and lightning
- Two people in spotter vehicles
- Stay on paved roads
- ALWAYS have an escape route
- Point spotters should have quick access to shelter
- Mobile spotters should keep their vehicle running

HOW TO REPORT

- Amateur Radio
  http://www.srh.noaa.gov/fwd/?n=repeat
- Phone: 1.800.792.2257
- Web: www.weather.gov/fortworth
- Social Media: Facebook & Twitter
  @NWSFortWorth #fwdspotter

Electronic Copy of this cheat sheet (without the codes)
Scan QR Code or

http://www.srh.noaa.gov/images/fwd/pdf/swa/SpotterHandout.pdf



Simplified supercell diagram, rear-flank downdraft (RFD), forward flank downdraft (FFD), and updraft (UD) areas are shaded. Arrows show air flow. The lines with barbs represent gust fronts (cold outflow). The lines with half circles represent the edge of the inflow air at ground level (warm inflow).

As a spotter, your location relative to this diagram will influence the winds you experience and the storm features you should see.

MID & UPPER LEVEL CLUES FOR SUPERCELLS

Looking for:

- **Signs of strong updrafts**
- **Rotation**

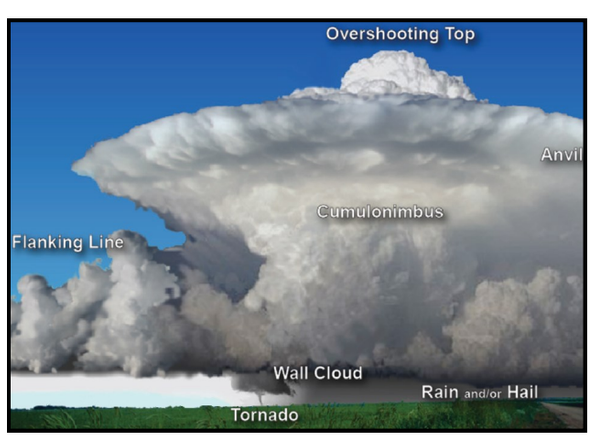
- ☐ Thick Anvil
- ☐ Crisp, cauliflower texture to updraft tower
- ☐ Round (Barrel Shaped) Updraft Tower
- ☐ Mid Level Cloud Banding
- ☐ Striations

LOW LEVEL CLUES FOR SUPERCELLS

- ☐ Rain Free Base
- ☐ Warm, moist air flowing into the storm
- ☐ Wall Cloud
- ☐ Inflow bands
- ☐ Shelf Cloud
- ☐ Tail Cloud
- ☐ Rising scud clouds becoming organized with time
- ☐ Increasing hail size suggests you are close to the updraft area
- ☐ Power Flashes or Debris

IS THE TORNADO THREAT INCREASING?

- ☐ Circular updraft base
- ☐ Increasing spin in wall cloud and cloud base
- ☐ Increasing inflow
- ☐ Rapid vertical motions near wall cloud
- ☐ Clear slot (rear flank downdraft) formation
- ☐ Precipitation burst behind wall cloud or a curtain of precipitation around wall cloud



ARE YOU SEEING A TORNADO IMPOSTER ?

- ☐ Scud which is not attached to cloud base (likely not rotating)
- ☐ Precipitation shaft (often has a fuzzy or stringy appearance)
- ☐ Smoke or Steam column (originates from a stationary point, likely not rotating)
- ☐ "Gustnado" (not associated with updraft, not attached to cloud base—moving away from rainfall area)

WALL CLOUD / SHELF CLOUD DIFFERENCES

WALL CLOUDS

- suggest updraft
- slope down and towards the precipitation
- maintain their position with respect to the precipitation
- form under a smooth, flat updraft base

SHELF CLOUDS

- suggest downdraft
- slope down and away from the precipitation
- visibly move away from the precipitation area
- have a ragged, choppy appearance to their base

ACCURACY IN REPORTING

- ☐ Be accurate with your location
  County
  City / Distance from City
  Intersection
- ☐ Consider signing up to spotternetwork.org to broadcast your location
- ☐ Report the location of phenomena, not merely your position
- ☐ Estimate the distance to the feature
- ☐ Use mPING (web app)

HAIL SIZE ESTIMATION

1/4"	Pea	1.75"	Golf Ball
1/2"	M&M (plain)	2"	Chicken Egg
3/4"	Penny / Dime	2.5"	Tennis Ball
7/8"	Nickel	2.75"	Baseball
1"	Quarter	3"	Tea Cup
1.25"	Half Dollar	4"	Grapefruit
1.5"	Ping Pong Ball	4.5"	Softball

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+----+----+----+----+----+----+----+----+----+
     0.5   1   1.5   2   2.5   3   3.5  4.0
```

WIND SPEED ESTIMATION

32-38 mph -- Whole trees in motion. Some resistance when walking

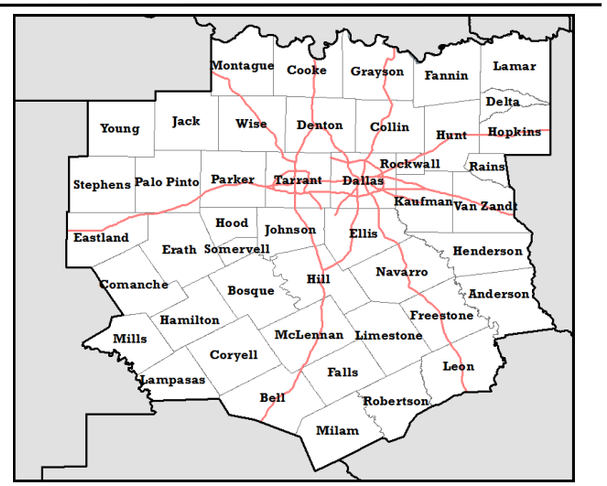
39-46 mph -- Twigs and small branches (1-3" diameter) broken off trees

47-54 mph -- Chimney covers and roof tiles blown off. TV antennas damaged. Lots of twigs and small branches on the ground.

55-63 mph -- Roof damage begins to occur. Small trees blown over or uprooted

64-75 mph -- Widespread damage occurs. Large trees uprooted or blown over.

75-112 mph -- Severe and extensive damage. Roofs peeled off. Windows broken. RVs and small mobile homes overturned. Moving cars pushed off roads.



My County's skywarn frequency: _____
http://www.srh.noaa.gov/fwd/?n=repeat

Proof of Attendance:
http://www.srh.noaa.gov/fwd/?n=skywarn_certificate

Other: http://www.srh.noaa.gov/fwd/?n=swaindex
Mobile "app" http://mobile.weather.gov

Tell us what you think:
http://goo.gl/t2jylh